



A.D. 1850 N° 13,412.

SPECIFICATION

OF

RICHARD RODHAM
AND
EDWARD ROBERT HOBLYN.

MACHINERY AND APPARATUS FOR
CONDENSING AND PURIFYING SMOKE.

LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,

PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:

PUBLISHED AT THE GREAT SEAL PATENT OFFICE,

25, SOUTHAMPTON BUILDINGS, HOLBORN.

1854.



A.D. 1850 N° 13,412.

**Machinery and Apparatus for Condensing and Purifying
Smoke.**

RODHAM AND HOBLYN'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, we, RICHARD RODHAM, of Gateshead, in the County of Durham, Practical Chemist, and EDWARD ROBERT HOBLYN, of Stepney, in the County of Middlesex, Gentleman, send greeting.

5 **WHEREAS** Her most Excellent Majesty Queen Victoria, by Her Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Sixteenth day of December, in the fourteenth year of Her reign, did give and grant unto us, the said Richard Rodham and Edward Robert Hoblyn, our exors, admors, and assigns, Her special license, full power, sole privilege, and
10 authority, that we, the said Richard Rodham and Edward Robert Hoblyn, our exors, admors, and assigns, or such others as we, the said Richard Rodham and Edward Robert Hoblyn, our exors, admors, and assigns, should at any time agree with, and no others, from time to time and at all times hereafter during the term of years therein mentioned, should and lawfully might make, use, exer-
15 cise, and vend, within that part of the United Kingdom of Great Britain and Ireland called England, and Wales, and the Town of Berwick upon Tweed, and in the Islands of Jersey, Guernsey, Alderney, Sark, and Man, and in all Her Majesty's Colonies and Plantations abroad, our Invention of "IMPROVE-
MENTS IN MACHINERY AND APPARATUS FOR CONDENSING AND PURIFYING SMOKE, GASES,
20 AND OTHER NOXIOUS VAPOURS ARISING FROM FIRE-PLACES AND FURNACES OR FROM CHEMICAL AND OTHER WORKS, AND IN RENDERING THE PRODUCTS ARISING FROM SUCH CONDENSATION AND PURIFICATION AVAILABLE FOR THE MANUFACTURE OF VARIOUS

Rodham & Hoblyn's Impts. in Machinery for Condensing & Purifying Smoke, &c.

COLOURS;" in which said Letters Patent is contained a proviso that we, the said Richard Rodham and Edward Robert Hoblyn, shall particularly describe and ascertain the nature of our said Invention, and in what manner the same is to be performed by an instrument in writing under our hands and seals, to be enrolled in Her Majesty's High Court of Chancery within six calendar 5 months next and immediately after the date of the said in part recited Letters Patent, as, reference being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, we, the said Richard Rodham and Edward Robert Hoblyn, do hereby declare that the nature of our said Invention, and the manner in which the same is to be per- 10 formed is particularly ascertained in and by the following description, reference being had to the Drawings hereunto annexed (that is to say):—

Our Invention relates to the construction of certain apparatus and machinery which is to be fixed contiguous to the furnaces of the works, or the furnaces of steam boilers, or to the apparatus, tanks, or reservoirs containing the chemical 15 ingredients undergoing the operation of manufacture, wherein all dense smoke, poisonous fumes, and noxious gases arising from these furnaces and works are conveyed, and whilst passing or being forced through such apparatus they will undergo a thorough condensation, purification, and washing, whereby they are rendered perfectly free from poison and all baneful and offensive properties. 20

It relates furthermore to the peculiar construction and adaptation of the channels or egress passages attached to the apparatus, whereby the whole of the precipitation resulting from the operation of condensation and purification can be retained and prevented from being wasted and washed away.

But in order that our Invention may be better understood and more readily 25 carried into effect, we will at once proceed to describe the same fully with reference to the Drawings, in which the same letters of reference denote similar parts, when the construction of the apparatus and the arrangement and disposition of the machinery may be at once understood.

Fig. 1 represents the elevation; and Fig. 2, the transversed vertical section 30 of the apparatus and machinery; and Fig. 3, plan view of Fig. 1. A, A, is a cylinder which may be either constructed of boiler plate and put together by rivets, or the same may be built of brick similar to a sunken well and cased in the interior with cement or iron as may be found the most desirable; but whichever mode of construction might be adopted, it is essential that the 35 cylinder A, A, should be securely fixed by bolts or otherwise to the floor or resting place B, B, which is shewn in the Drawing as built on arches, the use and convenience of which will be hereafter explained; C, C, is a conical top, which may be firmly secured to the cylinder A, A, by the flanges and nuts and

Rodham & Hoblyn's Impts. in Machinery for Condensing & Purifying Smoke, &c.

screws *a, a*, or by any more convenient means; *D, D*, represents the ascending flue communicating to the furnace, or with the tanks or reservoirs containing the chemical ingredients, and from which the deleterious fumes arise. Now it may be observed that the junction of the ascending flue with the conical top
5 *C, C*, is in the widest part of the top, so that the fumes and gases immediately on egressing from the narrow passage of the ascending flue may have abundance of room to expand and spread, which will considerably add to the more speedy and entire condensation and purification; *E, E*, is the escape passage leading to a flue, through which passage the purified vapours pass. The bottom of this
10 flue or passage must be on a level or nearly so with the bottom of the cylinder *A, A*; *F, F*, is an upright shaft which may be made of iron or other suitable material passing through the bottom of the cylinder *A, A*, and resting in the friction step or bearing *b*. The upper end of the shaft *F, F*, may be secured and have its bearing in various ways, but is shewn in the Drawings as working
15 in a stuffing box *c*, which is furnished with a hollow cup *d*, partly filled with oil, water, or any other lubricator. In order to prevent any of the fumes, gases, or water escaping by the aperture in the cylinder bottom through which the shaft *F, F*, passes, the hole is furnished with a short length of upright pipe *e, e*, the upper edge of which must be carried up to a height unto which the water
20 in the bottom of the cylinder must never rise, as otherwise it would overflow and run over the friction step or bearing *b*, and gear work underneath. *f* is an inverted cup fixed to the shaft *F, F*, and having its lower edges dipping to a sufficient depth into the water, as seen in section Fig. 2; in fact the arrangement is in all respects similar to the well-known hydraulic joint so commonly
25 used.

Now the most important part of the apparatus consists in the construction of the peculiarly shaped blades and fans which are fixed to the shaft *F, F*, bent, curved, and twisted in such a manner as to act when revolving with a downward exhausting action; *G, G, G, G*, are sheet iron fans or blades, the lower
30 edges of which are notched or jagged. These fans *G, G, G, G*, must be firmly secured to the shaft *F, F*, either by bolts passing through them and the shaft, or they may be screwed to projecting flanges which may be cast on to the shaft; *G¹, G¹*, are projecting plates so fixed in the inside of the cylinder *A, A*, to prevent the water escaping down the side thereof, and to throw it off against the
35 fans *G, G, G, G*. By referring to plan, Fig. 3, Sheet 2, it will be seen that the fans *G, G, G, G*, radiate from the shaft *F, F*, and are all curved in the same direction. *H, H*, are pieces of wire work having the meshes about one inch or one inch and a half, which are also fixed to the shaft *F, F*, and bent, twisted, and curved in a similar manner to the sheet iron fans *G, G, G, G*. It is de-

Rodham & Hoblyn's Impts. in Machinery for Condensing & Purifying Smoke, &c.

sirable to place these wire work fans the last of the series, as in that place they will better carry out the object for which they are required. We must here remark that the top fans G, G, which are immediately opposite the opening of the ascending flue D, D, must be concave as well as bent, twisted, and curved somewhat in the shape of a bowl of a spoon twisted. The fans must be so 5 fixed that the notched and jagged edges of the upper series must extend below the upper edge of the next succeeding series, as will be easily seen by consulting Fig. 2. G², Figs. 2 and 3, is a plate fixed immediately opposite the outlet of the ascending flue D, D, but which only runs from the shaft F, F, to the sides of the conical top C, C. The use of this plate G² (which we denominate a 10 baffle plate) is to conduct the gases and noxious vapours against the hollow part of the top fans G, G, and preventing their coming in contact with front part of the fans G, G. I is a band pulley which may be fixed at any convenient part of that portion of the shaft which projects through the bottom of the cylinder. It will be found desirable, when the locality will admit thereof, 15 to have the cylinder A, A, built on arches, as seen at Fig. 1, so as to allow sufficient room for a workman to have ready and easy access to do any work which may be necessary to the gearing. It is useless here to describe the means which may be employed for giving a rapid rotary motion to the shaft F, F, and fans G, G, G, G, as that must entirely depend on the description of furnace or nature 20 of the chemical or other works to which it is to be applied, and also to the nature of the power used upon the premises, for although a band pulley is shewn in the Drawings, the same and equally successful result may be obtained by two bevil wheels; but one important point must be borne in mind, which is, that whatever mechanical arrangement and power is to be applied, it 25 must be such as will be capable of increasing or diminishing at pleasure the speed of the shaft F, F, and fans G, G, G, G, as it will oftentimes be found necessary to cause them to rotate at a very high velocity, in order to create more draft and ebullition in the cylinder A, A. K, Fig. 1, is a water supply pipe leading from a cistern above, or from a force pump, to which is joined an 30 elbow pipe L fixed to the cover of the conical top C, C; M is a safety valve placed at the top of the water pipe K, to prevent it from bursting, should at any time the pressure of water be stronger than the weight on the valve and the escape of water. g, g, g, g, g, g, are cocks fixed to the horizontal elbow pipe L, with their nozzles penetrating the top plate of the conical top C, C, as 35 seen better in section, Fig. 2.

Now we will endeavour to describe the means of saving and retaining the products which result from the combined process of condensing, purifying, and washing the contents of the cylinder. The escape passage E may be con-

Rodham & Hoblyn's Impts. in Machinery for Condensing & Purifying Smoke, &c.

structured with a number of pits or hollows for receiving the deposit or sediment,
 the operation and use of which will be fully explained and made clear when the
 action of the whole apparatus is described, and which is as follows; and we
 shall, for example, suppose that the apparatus is in connection with the flue of a
 5 furnace used in the manufacture of lead :—The ascending flue D, D, communi-
 cating with the furnace wherein the noxious and poisonous fumes of lead are
 generated, would thereby become charged with them, and on the shaft F, F,
 and fans G, G, being immediately caused to rotate rapidly in the direction of
 the arrow's flight (see Fig. 3), the fumes and gases would be exhausted from
 10 the ascending flue D, D, into the cylinder A, A, and be mixed with the streams
 of cold water which would be forced through the cocks *g, g, g, g, g, g*. Now it
 is evident that the fumes and gases would enter the cylinder A, A, at the
 conical top C, C, into which they would expand in a most noxious and poisonous
 state, and would meet at once with the baffle plate G², and the top curved fans,
 15 which by the rapidity of their revolutions and downward exhausting action, in
 conjunction with the downward stream and rush of water would force them
 downwards and intermix them with the water, when they would come in con-
 tact with the second series of fans, which also by their curved form, rapidity of
 revolution, and with the cold water always streaming down, would again cut up
 20 and intermix them with the water which would constantly be washing those
 fumes and gases, and carry down with it the sediment, and so on until the
 fumes and gases would be drawn down to the wire work fans H, H, where
 they would be effectually and most completely intermixed and thoroughly
 washed and purified with the stream of water which would be continually
 25 pouring downwards, and the whole of the noxious and baneful portion and
 property of the fumes and gases would be entirely destroyed, and the fumes and
 gases would ascend the open flue, and escape into the air free of any deleterious
 particles, and perfectly innoxious. The sediment would be washed away from
 the cylinder with the current of water, but would run with the stream till it
 30 arrived at the first pit or hollow E¹, Fig. 4, Sheet 2, made in the prolonged flue
 E, when it would deposit itself at the bottom until that pit should be full, then
 it would pass on to the next pit E², and so on in rotation, until the whole of
 the pits should be full, when they could easily be removed by the openings in
 the top of the flue E³, or by any other suitable means. But various other means
 35 equally successful may be employed for saving the deposit, as the one we have
 just described, all that being required is a receptacle or receptacles for saving
 the sediments and products resulting from the operation of washing, so that
 they may be made available for the manufacture of various colours.

This description of apparatus may be successfully applied to all works and

Rodham & Hoblyn's Impts. in Machinery for Condensing & Purifying Smoke, &c.

factories where noxious vapours and smoke evolve from flues, chimneys, and in fact to any stove or furnace where a considerable quantity of smoke is generated, or where mineral, metallic, or other poisonous and noxious vapours and matters are emitted. The purified vapours can escape separately, the metallic and other impregnated matters previously contained in the gases, smoke, and fumes being completely separated by the continual intermixing of the fans, and the washing of the water, and deposited in the pits as before described. 5

Now it is evident that from the simplicity of the apparatus and the little space necessary for its erection, it may be admirably and most successfully adapted to the furnaces of steam vessels, whereby the whole of the dense smoke which is now emitted from the funnels would be entirely purified, and would obviate the use of such a cumbersome and unsightly appearance as the funnel presents, all that would be required being a short pipe to carry the hot vapour above the heads of the crew or passengers. 10

Having now described the nature of our Invention and the mode of carrying the same into effect, it must be understood that we make no claim for the use of a stream or streams of cold water for purifying and condensing the smoke and other noxious gases, as the same has been used to effect similar results; neither is any particular claim made for the exact shape, disposition, and construction of the apparatus, as the same may be varied without departing from the general principle thereof; but what we claim is,— 15 20

First, the constructing of apparatus and machinery wherein an arrangement of fans and blades is placed revolving at high velocity in conjunction with a stream or streams of cold water for purifying and depriving all smoke, fumes, gases, and vapours of all noxious and poisonous particles, as above described. 25

And, secondly, the arrangement of pits and hollows for receiving the sediments, and rendering them available for the manufacture of various colours.

In witness whereof, we, the said Richard Rodham and Edward Robert Hoblyn, have hereunto set our hands and seals, this Eleventh day of June, in the year of our Lord One thousand eight hundred and fifty-one. 30

RICHARD (L.S.) RODHAM.
EDWARD ROBERT (L.S.) HOBLYN.

AND BE IT REMEMBERED, that on the Eleventh day of June, in the year of our Lord 1851, the aforesaid Richard Rodham came before our said Lady the Queen, in Her Chancery, and acknowledged the Specification aforesaid, and all and everything therein contained and specified, in form above written. 35

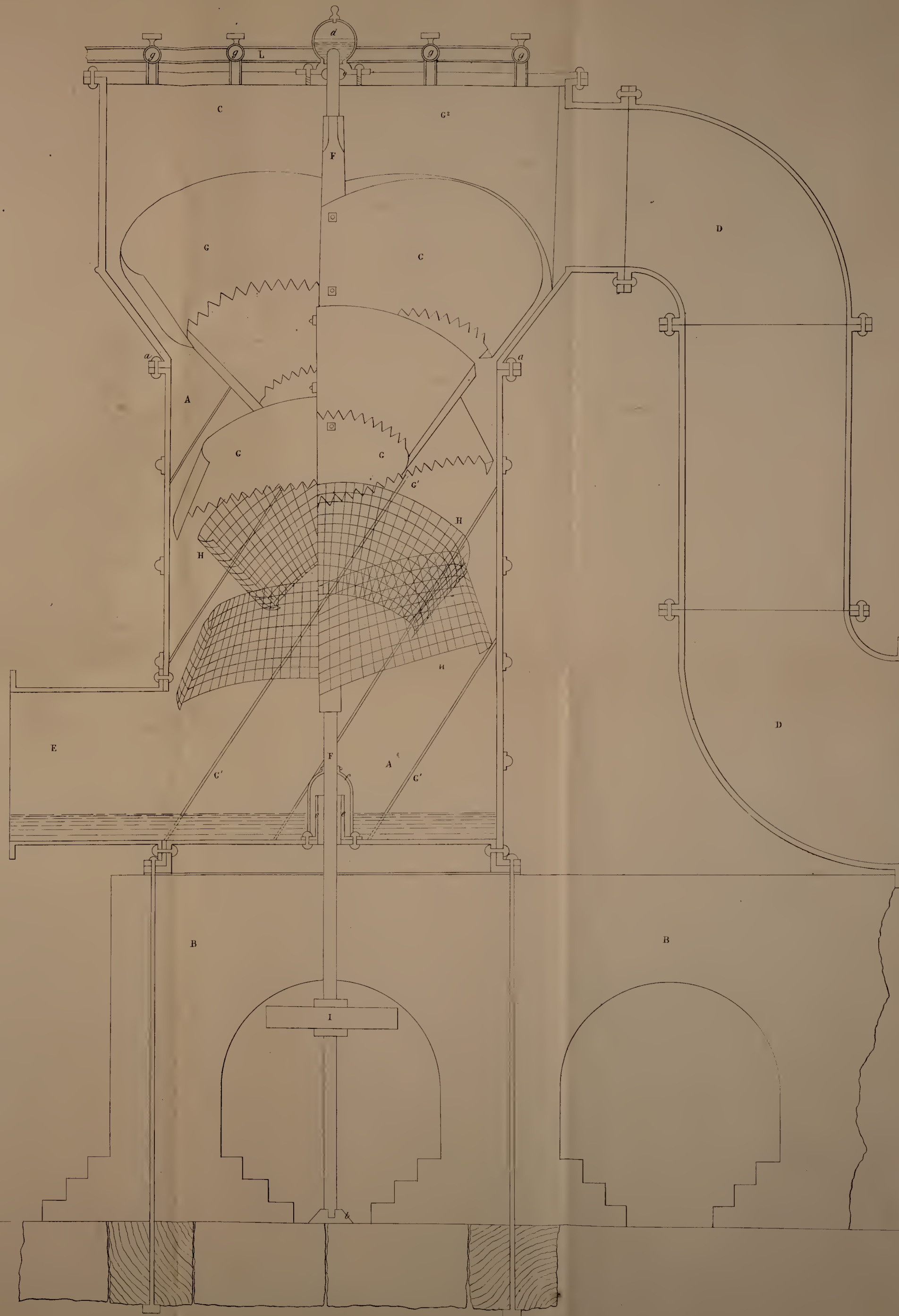
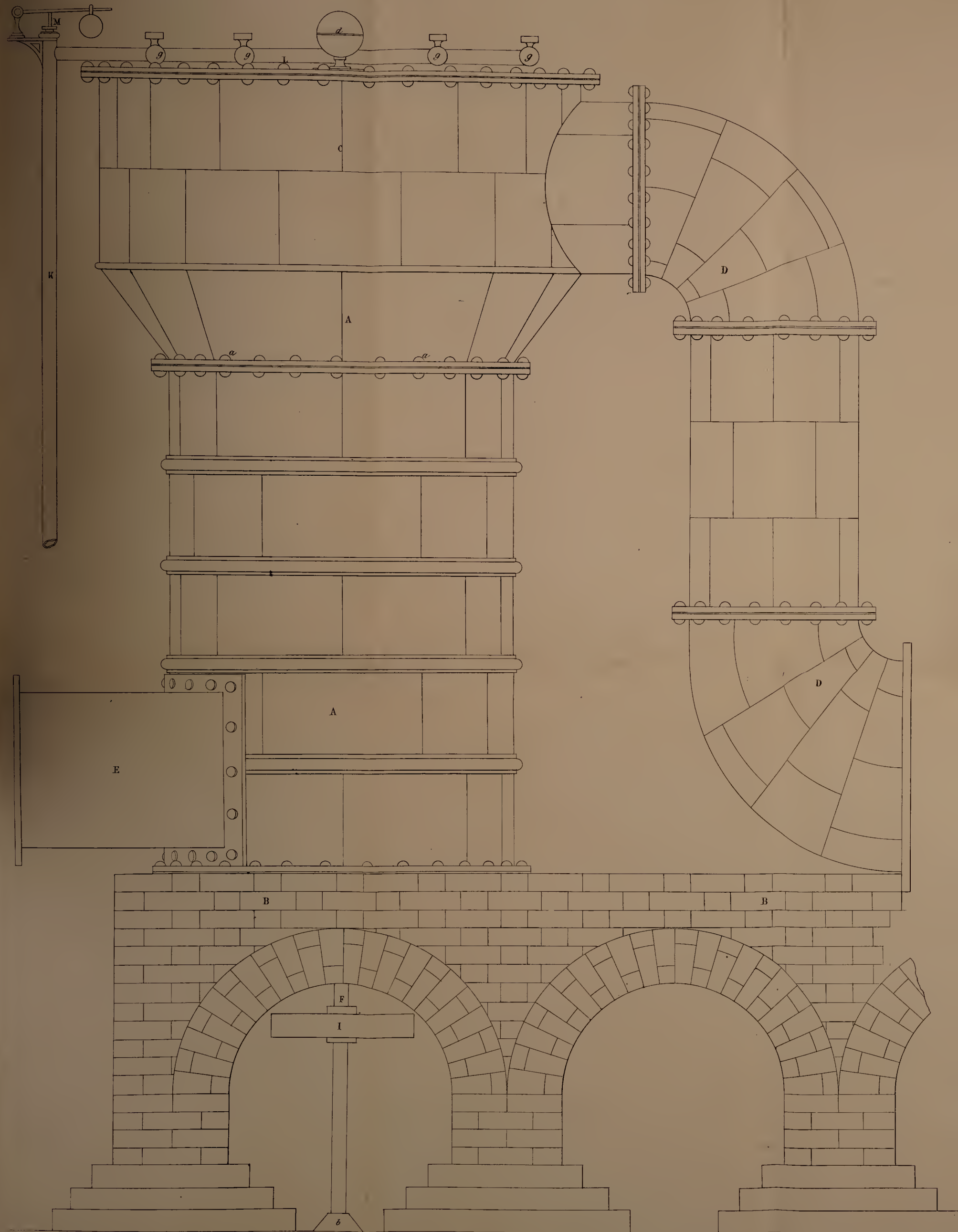


FIG. 3.

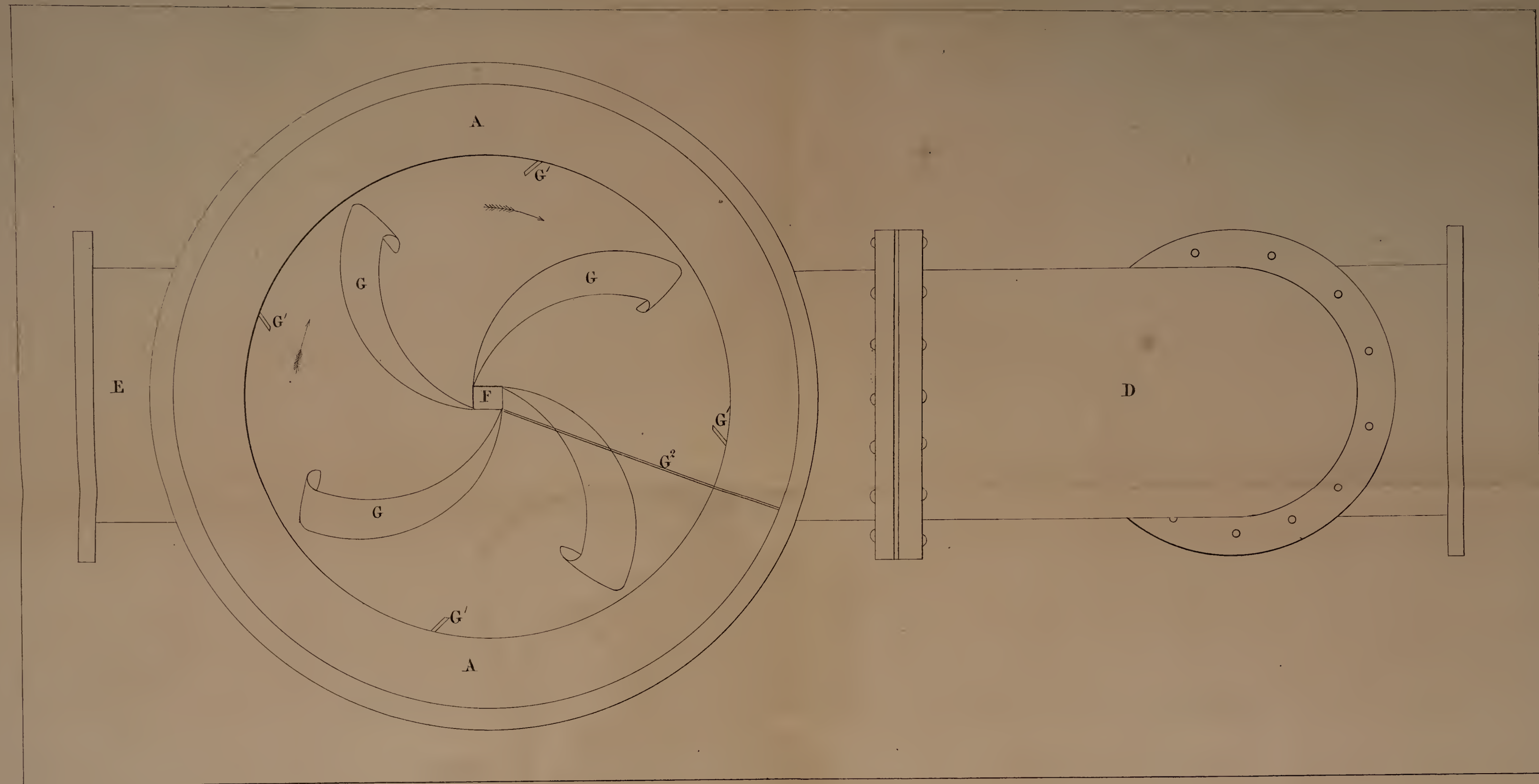
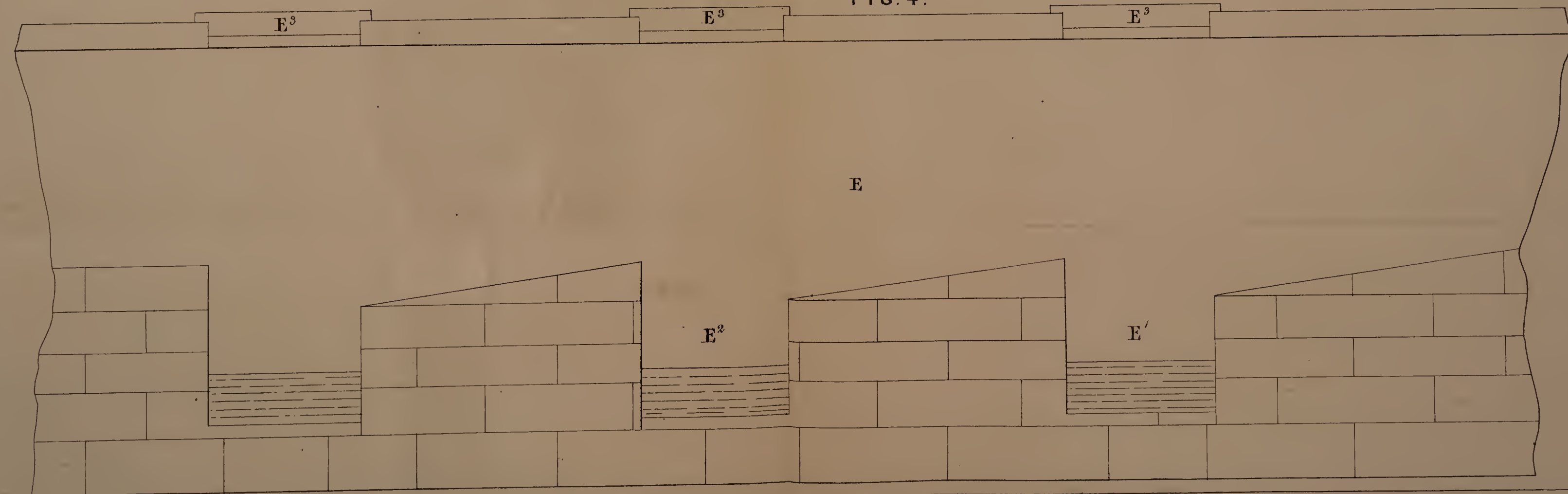


FIG. 4.



The enrolled drawing is not colored

Malby & Sons, Ltd.

Rodham & Hoblyn's Impts. in Machinery for Condensing & Purifying Smoke, &c.

AND ALSO BE IT REMEMBERED, that on the Fourteenth day of June, in the year of our Lord 1851, the aforesaid Edward Robert Hoblyn came before our said Lady the Queen, in Her Chancery, and acknowledged the Specification aforesaid, and all and everything therein contained and specified, in form
5 above written ; and also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

Enrolled the Sixteenth day of June, in the year of our Lord One thousand eight hundred and fifty-one.

LONDON :

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1854.

